

**Claims**

1. Combined demultiplexer and interpolator, **characterized** in that it receives a time multiplex of N signals and in that it  
5 generates N channels at  $1/D$  times the speed of the time multiplex, where D is an integer divider of N.
2. Combined demultiplexer and interpolator according to claim 1, **characterized** in that it receives a four signal time  
10 multiplex and in that it generates four channels at half the speed of the time multiplex.
3. Differential phase detector for generating a tracking error signal from the digitized signals (A, B, C, D) of four  
15 photodetectors, including a multiplexer for time multiplexing the digitized signals (A, B, C, D), **characterized** in that it includes a demultiplexer / interpolator for synchronizing the samples from the time multiplexed digitized signals (A, B, C, D).  
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4. Differential phase detector according to claim 3, **characterized** in that it includes summing means for summing the synchronized samples of the demultiplexer / interpolator to generate a data signal (HF).  
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5. Differential phase detector according to claim 3 or 4, **further** including means for compensating an attenuation of high signal frequencies caused by the interpolation.
- 30 6. Differential phase detector according to one of claims 3 to 5, **characterized** in that the demultiplexer /interpolator receives a time multiplex of N signals and in that it generates N channels at  $1/D$  times the speed of the time multiplex, where D is an integer divider of N.  
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7. Differential phase detector according to claim 6,  
**characterized** in that the demultiplexer /interpolator receives  
a four signal time multiplex and in that it generates four  
channels at half the speed of the time multiplex.

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8. Method for combined demultiplexing and interpolating,  
**including** the steps of:

- receiving a time multiplex of N signals, and
- generating N channels at  $1/D$  times the speed of the time  
multiplex, where D is an integer divider of N.

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9. Method for differential phase detection, **including** the steps  
of:

- digitizing the output signals (A, B, C and D) of four  
photodetectors,
- time multiplexing the digitized signals (A, B, C, D),
- synchronizing the samples from the time multiplexed digitized  
signals (A, B, C, D) with a demultiplexer / interpolator, and
- generating a tracking error signal from the digitized and  
synchronized signals (A, B, C, D)

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10. Apparatus for reading from and/or writing to optical  
recording media, **characterized** in that it includes a  
differential phase detector according to one of claims 3 to 7  
or performs a method according to claim 9 for differential  
phase detection.

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